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AMENDMENTS TO THE DRAWINGS

Attached is one drawing replacement sheet for FIG. 1 (total of 1 sheet) to subsequently amend the previously amended FIG. 1 to retain/reinstate FIG. 1 as originally filed, which can differ from FIG. 2, by amending the expression "program" in the previously amended FIG. 1 with "programdevice" herein.

In particular, "input programdevice" 10, "first recognition programdevice" 12, "second recognition programdevice" 15, "extraction programdevice" 18, and "output programdevice" 20 have been amended.

As discussed in the remarks section herein, entry and approval of the replacement drawing sheet for FIG. 1 is respectfully requested.

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REMARKS**STATUS OF THE CLAIMS**

Claims 1-20 are pending in the application.

Claims 1-20 are rejected under 35 U.S.C. 112, first paragraph, for failing to comply with the written description requirement.

Claims 1, 2, and 15-17 are objected to because these claims are very difficult to understand due to the use of confusing language.

Claims 17 and 18 are rejected under 35 U.S.C. 102(e) as being anticipated by Hotta (U.S. Patent No. 6,345,119).

Claims 1-16 and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hotta (U.S. Patent No. 6,345,119) and further in view of Shirasaki (U.S. Patent No. 6,341,176).

Claim 20 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hotta (U.S. Patent No. 6,345,119) and further in view of Arai et al. (U.S. Patent No. 6,697,524).

According to the foregoing and the remarks herein the specification and the drawings are amended. Thus, claims 1-20 remain pending for reconsideration, which is respectfully requested.

No new matter is added in this Amendment.

35 USC 112, FIRST PARAGRAPH, REJECTION AND CLAIM OBJECTION

Regarding the 35 USC 112, first paragraph, rejection, and the claim objection, the Applicants do not agree with the Office Action, because it is readily apparent that FIGS. 8, 9, 10 and 11 and descriptions thereof on page 21, line 12 to page 26, line 14; page 13, line 17 to page 14, line 6; and page 18 to page 21, line 11 (FIGS. 7A, 7B) of the present Application, fully, clearly, concisely, and in exact terms describe and support the claimed present invention according to 35 USC 112, first paragraph.

The claimed present invention identifies, in a captured text image, location(s) of non-coincidence between two recognized characters by different recognition methods. The independent claims 1, 2, 15, 16, and 17, using claim 1 as an example, provide, "an extraction unit *extracting the locations corresponding to the non-coinciding characters recognized*

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by the respective recognition algorithms," as fully, clearly, concisely, and in exact terms described and supported, for example, by FIGS. 7A, 7B, 8, 9, 10 and 11 of the present Application. Further, it is readily apparent that the claim recitation, **"extracting the locations corresponding to the non-coinciding characters recognized by the respective recognition algorithms,"** is not difficult to understand and the claim language is not confusing.

For example, page 18, lines 1-12, fully, clearly, concisely, and in exact terms describes:

As shown in FIG. 7A, which is an explanatory diagram of processing performed by a recognition program, the rows i ($i=1-i_{\max}$) of the text image are converted into units corresponding to the horizontally written text images, and the image data in the character areas are sliced from the text images. In accordance with the present invention, when the text images to be processed are written vertically, the columns of text images are converted to units and the image data in the character areas are sliced from the text images. Further, when the input program 10a reads the text images according to whether the text images are written horizontally or vertically, this information is obtained from the user, the application program, or the like.

Next, in step ST2, the character areas for each of the characters in the text images are sliced from the image data in the row units and the position in the image data is detected according to the well-known slicing algorithm.

For example, page 21, lines 12-15, fully, clearly, concisely, and in exact terms describes:

As shown in FIG. 8, in accordance with the present invention, when a character recognized by the first recognition program 12a and a character recognized by the second recognition program 15a do not coincide, the recognized character having a higher evaluation value of the two recognized characters is set for processing.

Page 24, lines 6-15 (see FIG. 10) fully, clearly, concisely, and in exact terms describes:

In any event, in step ST17, processing is performed whereby either the recognized characters whose locations do not coincide but are recognized by the first recognition program 12a or the recognized characters whose locations do not coincide but are recognized by the second recognition program 15a are selected and set for display.

Next, in step ST18, the character positions for the recognized characters that do not coincide are detected from the recognized characters with equal image data positions. At the same time, the evaluation values of the two recognized characters that do not coincide are compared, and the recognized characters with the higher evaluation value are set for display.

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Page 26, line 15 to page 27, line 14 (see FIG. 10) fully, clearly, concisely, and in exact terms describes:

FIG. 10 illustrates an example of the display screen on which the output of the output program 20a is displayed in accordance with embodiments of the present invention.

As shown in FIG. 10, the Chinese character "ki" ["opportunity"] which is shown in (1) has different recognition results for the first recognition program 12a and the second recognition program 15a. Display is made by setting the Chinese character "ki" which is to be displayed and which is a recognized character with a high evaluation value according to the processing in step ST14 in the flow chart shown in FIG. 4.

The following situation is supposed. The Chinese character "ka" ["become"] indicated in (2) has different recognition results for the first recognition program 12a and the second recognition program 15a. The katakana characters "i" and "hi," which are recognized characters with a large number of characters are set for display according to the processing step ST17 of the flow chart shown in FIG. 5.

The following situation is also supposed. When the cursor indicated by the [▲] is displayed for the Chinese character "bun" ["writing"], indicated in (3), the [▲], indicating that it is a position in the image data denoted by the cursor, is displayed at a position that corresponds to the image data of the text image displayed on the window on the left-hand side.

Page 13, line 17 to page 14, line 6, fully, clearly, concisely, and in exact terms describes:

Thus, in accordance with embodiments of the present invention, when recognizing characters in the text images, the character recognition device 1 uses multiple recognition devices that respectively use different recognition methods for processing the text images read by the image scanner 2. The non-coinciding locations of the recognition results of the multiple recognition devices are extracted and the non-coinciding locations are designated while at the same time, the character recognition results are output. In accordance with the present invention, the user can instantly see the erroneously read characters in the recognition results, thus making it possible to efficiently check such erroneously read characters.

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For example, the claim 1 recitation, "where the recognized characters of the respective algorithms are ***non-coinciding for some corresponding same locations of the text image and coincide for other corresponding same locations of the text image***," (FIG. 8, positions $j+1$), is fully, clearly, concisely, and in exact terms described and supported, for example, by the descriptions of FIGS. 7A, 7B, 8 and 9, page 16, lines 6-12, page 18, page 25, lines 6-15, page 26, lines 4-14, and page 26, line 15 to page 29, line 13 (FIGS. 10 and 11), which provide "a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same, and shall set forth the best mode contemplated by the inventor of carrying out his invention" (35 USC, first paragraph) and "particularly point out and distinctly claim the subject matter which the applicant regards as his invention" (i.e., the claims are also definite according to 35 USC 112, second paragraph). Further, the claim recitation, "a multiple recognition unit to ***perform character recognition of the text image using at least two different character recognition algorithms***, each algorithm producing its own recognized characters from the same text image, where ***the recognized characters of the respective algorithms are non-coinciding for some corresponding same locations of the text image and coincide for other corresponding same locations of the text image***" and "extracting the locations corresponding to the non-coinciding characters recognized by the respective recognition algorithms," is not difficult to understand and the claim language is not confusing.

Regarding dependent claim 18, the recitation, "when a user is editing text of the text image location, ***directing the editing to the identified areas***," is fully, clearly, concisely, and in exact terms described and supported by FIGS. 10 and 11 and descriptions thereof. For example, in FIG. 10, the circled number 1, can direct an editing user to an identified area.

It is readily apparent the dependent claim 20 recitation, "***displaying characters in the identified areas based on which recognition algorithm had a highest recognition evaluation for the respective characters***," is fully, clearly, concisely, and in exact terms described and supported, for example, in page 21, lines 12-15.

Accordingly, withdrawal of the objection and the 35 USC 112, first paragraph, rejections is respectfully requested.

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35 USC 102 AND 103 REJECTIONS

Claims 17 and 18 are rejected under 35 U.S.C. 102(e) as being anticipated by Hotta (U.S. Patent No. 6,345,119).

Claims 1-16 and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hotta (U.S. Patent No. 6,345,119) and further in view of Shirasaki (U.S. Patent No. 6,341,176).

Therefore, independent claims 1, 2, 15, 16 and 17 are rejected over Hotta and Shirasaki.

Regarding Hotta, the Office Action in the Response to Arguments maintains that column 16, lines 55-60 and FIGS. 4, 14 discloses the claimed present invention. However, this Hotta description relates to the hierarchical clustering process and the character category determination result amending process 17. Hotta's character category determination result amending unit 17 amends the character category determination result, based on the clustering result stored in the clustering result storage unit 16 and the category determination result of all characters stored in the all character category determination result storage unit 12 (column 16, lines 34-41).

Hotta, column 16, lines 55-60, which is relied upon in the Office Action, provides determining whether or not the character categories of the integrated clusters match each other based upon the category determination result of all characters stored in the all character category determination result storage unit 12, and based upon the matching, amends the character category of the cluster. The clustering unit 15 performs a clustering process by sequentially integrating characters indicating high similarity to all feature vectors computed by the feature vector computing unit 10 (column 5, lines 63-65). FIG. 11 shows Hotta's concept of the hierarchical cluster process based upon a stored feature vector to improve recognition of a character (FIG. 18, step 26 and column 22, lines 23-37 relied upon in the Office Action). In particular, Hotta generates clusters by clustering feature vectors of an input character, when there is a cluster belonging to a character category close to a cluster belonging to another character category, the recognized character category of the cluster having a smaller number of input characters between the two clusters is amended to the recognized character category of the cluster having a larger number of input characters (column 4, lines 6-26).

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It is readily apparent that Hotta's clustering as relating to a character recognition process, and differs from the claimed present invention's:

1. (PREVIOUSLY PRESENTED) A character recognition device to recognize characters in a captured text image, comprising:

a multiple recognition unit to **perform character recognition of the text image using at least two different character recognition algorithms**, each algorithm producing its own recognized characters from the same text image, where **the recognized characters of the respective algorithms are non-coinciding for some corresponding same locations of the text image and coincide for other corresponding same locations of the text image**;

an extraction unit **extracting the locations corresponding to the non-coinciding characters recognized by the respective recognition algorithms**; and

an output unit **designating the locations of non-coinciding results extracted by the extraction unit** and outputting character recognition results for the text image.

Hotta's clustering process for improving character recognition is based upon clustering of feature vectors of characters as elements and not based upon **"the recognized characters of the respective algorithms are non-coinciding for some corresponding same locations of the text image and coincide for other corresponding same locations of the text image,"** because Hotta does not discuss using multiple recognition processes and identifying, in a captured text image, location(s) of non-coincidence between two recognized characters by different recognition methods.

The Office Action in item 9, page 6, alleges that Hotta's FIG. 4 and boxes 9-11 and 15 are similar to the claimed present invention's multiple different character recognition algorithms. Although Hotta's character category determining unit 11 and clustering unit 15 could be deemed as different character recognition algorithms, Hotta does not to provide the claimed present invention's, **"where the recognized characters of the respective algorithms are non-coinciding for some corresponding same locations of the text image and coincide for other corresponding same locations of the text image**; an extraction unit **extracting the locations corresponding to the non-coinciding characters recognized by the respective recognition algorithms**," because Hotta's recognition algorithms are not used to identify locations of non-coinciding characters by multiple different recognition algorithms in the captured text image, but Hotta's clustering is used to amend the character category determination.

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FIG. 11 shows Hotta's concept of the hierarchical cluster process based upon stored feature vectors to improve recognition of a character (FIG. 18, step 26 and column 22, lines 23-37 relied upon in the Office Action), which differs from the claimed present invention's, "an extraction unit **extracting the locations corresponding to the non-coinciding characters recognized by the respective recognition algorithms.**" In other words, Hotta is not concerned with locations of characters in the captured text image and does not perform **"extracting the locations."** Hotta's clustering process in FIG. 18 is based upon comparing closest feature vectors to generate clusters and then identifying candidates for misrecognized clusters based upon clusters that have a low number of elements (step 26, column 24, lines 38-51), and the recognition of a character is improved in step 27.

Further, the Office Action relies on Shirasaki for discussing the claimed present invention's "an output unit **designating the locations of non-coinciding results extracted by the extraction unit** and outputting character recognition results for the text image," for example, based upon FIG. 33, G6-G8 and column 2, lines 65-67 and column 16, lines 43-50 and FIGS. 43-44. However, Shirasaki fails to disclose or suggest the claimed present invention's, "an extraction unit **extracting the locations corresponding to the non-coinciding characters recognized by the respective recognition algorithms.**" Accordingly, even if one skilled in the art combined Hotta and Shirasaki, such a combined system fails to disclose or suggest the claimed present invention's use of multiple recognition processes and identifying, in a captured text image, location(s) of non-coincidence between two recognized characters by different recognition methods," because as discussed herein Hotta fails to disclose or suggest, **"to perform character recognition of the text image using at least two different character recognition algorithms, each algorithm producing its own recognized characters from the same text image, where the recognized characters of the respective algorithms are non-coinciding for some corresponding same locations of the text image and coincide for other corresponding same locations of the text image,"** and it is readily apparent, as the Office Action also does not rely on Shirasaki, that Shirasaki fails to disclose or suggest the same, so that Hotta and Shirasaki could not achieve and/or render obvious the claimed present invention as recited in independent claims 1, 2, 15, 16 and 17.

Accordingly, withdrawal of the anticipatory and obviousness rejections is respectfully requested.

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DEPENDENT CLAIM 20

Dependent claim 20 is patentably distinguishing over Arai, because Arai fails to disclose or suggest the claimed present invention's, "***based on which recognition algorithm had a highest recognition evaluation for the respective characters.***" Arai discusses registering a character by presenting candidates of recognized characters using recognition scores, but the score is based upon a single recognition algorithm.

IN THE DRAWINGS AND SPECIFICATION

According to 37 CFR 1.121 and MPEP 714.22 guidance, concerning subsequent amendments to previously amended paragraphs, according to the foregoing, FIG. 1 and the specification as indicated are subsequently amended herein to present and reinstate previously deleted/amended matter.

In the Office Action mailed November 4, 2003, page 2, FIG. 1 was objected to:

New corrected drawings are required in this application because of the elements 10, 12, 15, 18 and 20 of FIG. 1. The term 'device' is not appropriately used in this drawing. One skilled in the art is not quite clear in understanding the multiple device are existed inside the character recognition device. The character recognition device would be appropriate to have multiple software module that perform different functionalities of the character recognition device. However, it does not seem to have different hardware/device to perform the designed functions inside the character recognition device.

In the previous Amendment filed March 24, 2004 in reply to the Office Action of November 4, 2003, FIG. 1 and the specification paragraphs were amended to replace the expression "device" with "deviceprogram." However, contrary to the Office Action objection rationale, according to the claimed present invention, the expression "device" is directed to programmable computing hardware or electronic devices, such as a circuit, and supported in the specification on page 15, line 2. A character recognition device of the present invention can be implemented by any combination of software modules and/or hardware/devices (see, original FIG. 1 and FIG. 2 of the present Application), and one skilled in the art would understand the same based upon page 14, line 17 to page 15, line 2 of the present Application.

Therefore, according to the foregoing, previously amended FIG. 1 is amended again

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herein to retain FIG. 1 as originally filed. Amended FIG. 1 and FIG. 2 can be different. In particular, attached is one drawing replacement sheet for FIG. 1 (total of 1 sheet) to retain FIG. 1 as originally filed, which is different from FIG. 2, by amending the expression "program" in the previously amended FIG. 1 with "program device" herein.

According to the foregoing, the specification on page 12, lines 6-11 is newly amended herein for clarification by inserting the expression "a circuit, or the like," in view of and supported by page 14, line 17 to page 15, line 2 of the present Application.

Also, according to the foregoing, the previously amended specification from page 10 to page 14 is amended herein to retain its original language as filed by reciting "program device."

Entry and approval of the specification and drawing amendments is respectfully requested. The objection in the Office Action of November 4, 2003 is hereby traversed.

CONCLUSION


In view of the amendments and remarks, withdrawal of the objections and rejections and allowance of pending claims is respectfully requested.

There being no further outstanding objections or rejections, it is submitted that the application is in condition for allowance. An early action to that effect is courteously solicited.

Finally, if there are any formal matters remaining after this response, the Examiner is requested to telephone the undersigned to attend to these matters.

Respectfully submitted,
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